

## HOW CHANGES OCCUR NATURALLY IN ECOSYSTEMS

In **NATURAL SELECTION**, the best-adapted members of a species survive to reproduce. These individuals may pass favourable characteristics on to their offspring. As abiotic and biotic components of their environment change, **ADAPTIVE RADIATION** may result. Adaptive radiation is the change from a common ancestor into a number of different species that “radiate out” to inhabit different niches. For example, 13 species of finch that fill different niches on the Galapagos Islands are thought to have developed from a single species from mainland South America.

**ECOLOGICAL SUCCESSION** refers to changes that take place over time in the types of organisms that live in an area. There are two types of ecological succession:

1. **PRIMARY SUCCESSION**: Primary succession occurs in areas where no soil exists, such as following glaciation or a lava flow. Wind and rain carry spores of lichens to these areas. Lichens obtain nutrients by secreting chemicals that break down rock. As lichens decay, they add organic matter to the developing soil.

The first organisms to survive and reproduce in an area are called **PIONEER SPECIES**. They are adapted to grow in harsh, nutrient-poor conditions. In time, often over hundreds of years, the weathering of rocks and decay of pioneer species cause soil formation.

The abiotic conditions of the ecosystem continue to change as new species of plants and animals colonize the area, each competing for nutrients, moisture, and sunlight. More niches are created and biodiversity increases.

Eventually, primary succession leads to the development of mature **CLIMAX COMMUNITIES**, such as a boreal forest or grassland.

2. **SECONDARY SUCCESSION**: Small disturbances, such as fire, often occur in ecosystems. Secondary succession – succession that occurs as a result of a disturbance to an area that already has soil and was once the home of living organisms – occurs as a result. It proceeds much faster than primary succession since micro-organisms, insects, seeds, and nutrients still exist in the soil.

**NATURAL EVENTS** can destroy habitats, reduce biodiversity, and cause regions to undergo succession. Some examples include flooding, drought, insect infestations and tsunamis.